

## MEDICINE AND DENTISTRY

### 1. Introduction

Even in the early XXI century removal of tumors of the neck remains an urgent problem of medicine, taking into account the severe complications and high mortality [1].

In the total cancer incidence neck tumors account for about 5 % of all cancer cases. Indicator of 5-year survival rate in this group is the lowest among of tumors and for this patient population ranges from 30 to 50 % [1].

Surgical treatment of neck tumors is complex. Defeat tumor structures that control such functions as speech, swallowing, taste, the blood supply to the brain make their removal impossible or lead to disability. All these structures can be lesions in malignancy and influence the choice of optimal treatment [2].

The tumor of carotid node is called carotid chemodektoma (chemodectoma, carotid paraganlioma, carotid body tumor) that make up 20–30 % of paragangliomas in the neck [3]. This term was proposed in 1950 by Milligan [4].

Carotid chemodectomy occurs quite rarely, it grows slowly over several years. According to some authors, the average tumor growth rate is 0.83 mm/year. In the structure of tumor pathology, carotid chemodectomy is only 0.012 % [5]. The frequency of this tumor in the population is 1 case of 1.3–2.5 million people [6].

It should be noted that most of the authors in their works demonstrate a significant contradiction in views on the solution to the problem diagnosis, treatment strategy and tactics surgery for carotid body tumor [7].

At the beginning of the 90 th century 66 % removal of carotid hemodectoms ends only in its relapse in the 7.7–9.4 % – not radical surgery, and in 21.8 % of cases the tumor is considered unresectable [8].

Surgical treatment of neck tumors is a difficult task, due to the adherence of critical structures that control functions such as speech, swallowing, taste, blood flow to the head. Nerves, trunk vessels can be damaged in the tumor process and influence the choice of surgical tactics [9].

Modern treatment of the tumor process involves not only the removal of the tumor, but also the primary task of maintaining the proper quality of life and maximizing the preservation of functional integrity of the body and the body as a whole [10].

**Aim.** To improve the results of surgical treatment of patients with carotid body tumor

### EXPERIENCE OF SURGICAL TREATMENT OF THE CAROTID BODY TUMOR AND TUMORS WITH INVASION AT THE CAROTID VESSELS

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**Abstract:** The analysis of the structure and results of surgical treatment of 72 patients who were hospitalized in the department of vascular surgery of Lviv regional hospital for the period 1995 to 2017 was realized. Among the 42 cases was diagnosed carotid body tumors (1-st study group) and in 30 patients (2-nd control group) other tumors of the neck were detected. In the first group structure of surgery operation was: tumor removal and suturing the vascular wall defects – 76 %, resection and shortening of the common carotid artery – 21 %, expansion of the internal carotid artery – 3 %, ligation of the external carotid artery – 10 %, lymphadenectomy – 28 %, prosthetic vascular wall – 3 %, the tumor resection – 3 %, internal jugular vein ligation – 7 %, excision of fragment muscle – 3 %, nerve resection – 14 %. In the second group, the following surgical operations were performed: removal of the tumor and suturing of the defects of the vascular wall – 96 %, lymphadenectomy – 48 % tumor resection – 30 %, ligation of the internal jugular vein – 14 %, removal of the muscle fragment – 4 %, resection of nerves – 13 %. In group 1, intraoperative complications were observed in 1 (3.4 %) cases, which were manifested by massive bleeding from the tumor, requiring a repeated surgical intervention to stop the bleeding. Postoperative complications were observed in 1 (3.4 %) cases when acute cerebral ischemia developed. In 1 (3.4 %) cases, tumor recurrence was observed after 9 years. Clinic experience shows that surgery is an effective treatment for the carotid body tumor and tumors with invasion into vessels of the neck, providing a low rate of complications, a full recovery or long-term remission.

**Keywords:** chemodectoma, carotid body tumor, paraganlioma, neck, carotid arteries, vessels, tumor invasion, lymphadenectomy, surgical treatment.

### 2. Methods

The results of the retrospective examination and treatment of 72 patients with tumors of neck vessels, who were hospitalized in the vascular surgery department of the Lviv Regional Hospital from 1995 to 2017 on the basis of medical records of patients, were analyzed.

Among the patients were 36 (50 %) men and 36 (50 %) of women aged between 4 – 69 years. The average age of patients was 38.7 years. Persons of working age were 62 (86 %) people.

In these cases the structure of cancer in the neck was as follows: benign tumor – 17 (24 %), malignant tumor – 13 (18 %), carotid chemodectoma (carotid body tumor) – 42 (58 %).

To study the characteristics of clinical course of carotid chemodectoma all clinical cases were divided into two groups. The first, a core group includes clinical cases of carotid body tumor (CBT), 42 patients. Second, the control group, was formed from clinical cases of tumor invasion of another current bunch oncogenesis, and included 30 patients. There were studied, compared and summarized the main aspects of clinical groups by gender, age, length of history, structure complaints and objective methods of research data, the feature of the volume and nature of the surgery.

In the course of the study, measures were taken for the safety of the patient's health, observance of his rights, human dignity and moral and ethical standards in accordance with the principles of the Helsinki Declaration of Human Rights, the Council of Europe Convention on Human Rights and Biomedicine.

### 3. Results

In the studied groups in total 66 operations were performed.

In the main group in 1 patient in the hospital stay developed acute myocardial ischemia, which was the contraindication to the operation and the patient was transferred to a specialized cardiology department.

In the second group of additional examination in 2 patients the presence of multiple metastases combined lymphocyte – phagocytic immunodeficiency in one clinical case. In 1 patient we diagnosed multiple metastases in the internal organs and locus of massive tumor in the neck, which was recognized inoperable. Patients were discharged from the hospital for symptomatic treatment in the community. Three patients refused surgical intervention and were under observation.

In the group of CBT were performed 38 operations and in the second group 28 respectively. The average duration of the operation in the first group was 114  $\pm$  31 min. and In the second group of 90  $\pm$  26 min. The duration of postoperative hospital stay of patients is on average 5 days.

In CBT group the structure of surgery operation was: tumor removal and suturing the vascular wall defects – 76 %, resection and shortening of the common carotid artery – 21 %, expansion of the internal carotid artery – 3 %, ligation of the external carotid artery – 10 %, lymphadenectomy – 28 %, prosthetic vascular wall – 3 %, the tumor resection – 3 %, internal jugular vein ligation – 7 %, excision of fragment muscle – 3 %, nerve resection – 14 %.

In the second group, the following surgical operations were performed: removal of the tumor with vascular wall defect closure – 96 %, removal of the tumor with resection of the sterno-clavicular muscle – 4 %, tumor removal with rotary intersection nerve – 13 %, removal of metastases – 30 %, excision of the tumor with resection of the internal jugular vein – 14 %, removal of the tumor with lymphadenectomy – 48 %.

Pharmacological support of these patients included the antibiotics (cephalosporins), anticoagulants (Bemiparyn), the choice of the drug we justify by the presence of data on its anticancer properties, decongestants means (L – lysine escunat).

In the first group, we observed intraoperative complications in 1 (3 %) patient with CBT (type I for Stamblin), which were manifested by massive tumor bleeding. Among the postoperative complications in 1 (3 %) patient with CBT (type III for Stmblin), 2 days after the operation developed acute cerebral ischemia due to stenosis of the internal carotid artery. A repeated operation was performed: resection of the common carotid artery and endarterectomy of the internal carotid artery, after which the symptoms of the patient were completely regressed.

In 1 (3 %) case, we had a recurrence after 9 years, which was re-operated. In the second group, in 1 intraoperative case it became necessary to establish tracheostomy due to severe deformity of the larynx. In the same patient in the postoperative period there was observed paralysis of the facial nerve and swallowing difficulties.

After conducting surgical intervention in the CBT group, in 10 (25.64 %) patients we observed such neuropathies as: facial nerve – 2 (5.12 %), wandering and rotary nerve – 5 (12.82 %); tongue-throat nerve – 1 (2.56 %); transverse nerve of the neck – 10 (25.64 %); hyoid nerve – 7 (17.95 %); Horner syndrome – 1 (2.56 %). In this case, neuropathy has an abortive flow and completely regress after 6 months. after surgical intervention.

Operative interference with carotid chemodectomy is accompanied by an operating blood loss in the middle of 173 ml versus 97 ml of blood loss in the control group. Relative risk of massive intraoperative bleeding in carotid chemodectomy is 1.78 times higher than in other tumors with this localization. In this case, there is a direct high correlation between the size of the tumor and the degree of blood loss.

By 2017, the term for patient monitoring is between 1 and 17 years. At present, we have not seen any clinical case of me-

tastasis of the CBT. In this case, patients have an active lifestyle, do not have professional contraindications. That is why we can assert that the prognosis for CBT is favorable under the condition of surgical treatment.

#### 4. Discussion

Clinic experience shows that surgery is an effective treatment for the carotid body tumor and tumors with invasion into vessels of the neck, providing a low rate of complications, a full recovery or long-term remission.

We have shown that the technique of surgical intervention developed by us provides an equivalent level of bleeding in comparison with the combined methods of preoperative embolization of feeding branches with solutions of EVOH and «Poloxamer-407» [11].

Traditional preoperative embolization in modern studies shows high efficacy, but its use is limited by the complexity of vascular anatomy and the presence of small feeding vessels that are difficult to catheterize [12]. At the same time, these techniques increase the risk of thromboembolic complications in the cerebral pool, which are absent in our method.

Several authors note that after surgery, some patients have a neurological deficiency in the form of elements of the Willard syndrome – one-sided combined lesion of the thymus, pharyngeal, sublingual, extra nerve and cervical nodes of the sympathetic trunk [13].

Our studies have shown that although neuropathy takes place, however, it rapidly regresses and causes the patient's disability. A condition for this is the continuous control of the nerves in the surgical wound and the avoidance of their trauma when manipulating the tumor.

Radiation and chemotherapy therapies proposed by individual authors can only be recommended to patients who have contraindications to surgery from other systems of the body [14].

In patients who underwent radiotherapy courses prior to surgery, we noted increased bleeding and radiation angiosclerosis, which complicated the operation and rehabilitation of patients

Surgical intervention in these patients should be performed by vascular surgeons, as the surgical removal of these tumors, especially the carotid body tumor often requires resection, common carotid artery and internal carotid artery prostheses.

Our study shows that tumors in the neck area are not judgments for the patient. The surgical removal of such tumors, and in particular CBT, allows a patient to have a long life and high quality life. The number of complications in operations are at an acceptable level.

Today, the presence of tumor invasion in the neck's major vessels should not be seen as a contraindication to the operation and removal of the tumor.

The use of modern vascular techniques makes it possible, if you do not remove the tumor completely and reduce its volume, to prevent the development of vascular complications, which greatly improves the quality of life of a patient.

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